Use Ultrasound to Identify Leaks

NaturalGas EPA POLLUTION PREVENTER

Partner Reported Opportunities (PROs) for Reducing Methane Emissions

PRO Fact Sheet No. 602

Applicable sector(s):

■ Production ■ Processing ■ Transmission and Distribution

Partners reporting this PRO: Texaco (now ChevronTexaco Corporation)

Other related PROs: Conduct DI&M at Remote Facilities, Test and Repair Pressure Safety Valves, Inspect and Repair Compressor Station Blowdown Valves

- Compressors/Engines ☐
- Dehydrators ☐
- Pipelines ☐
- Pneumatics/Controls ☐
- Tanks ☐
- Valves ■
- Wells ☐
- Other ☐

Technology/Practice Overview

Description

The shutoff valves that prevent high-pressure gas leakage to the atmosphere through open-ended lines often leak. This leakage is difficult to detect because the vent stack is out of reach and the gas is invisible. Partners reported using ultrasonic detectors to identify leaking valves.

Ultrasound leak detectors, like a stethoscope, listen to the unique noise of gas leakage through a valve. Electronics are used to filter out the low frequency noise of compressors and reveal high frequency sounds associated with gas leakage. When placed on pressure relief, blowdown, starter motor, and unit isolation valves, the ultrasound detector indicates whether the valve is tightly shut and the magnitude of leakage.

Methane Savings: 2,000 Mcf per year

Costs

Capital Costs (including installation)

■ <$1,000 ☐ $1,000 – $10,000 ☐ >$10,000

Operating and Maintenance Costs (annual)

☐ <$100 ☐ $100-$1,000 ■ >$1,000

Payback (Years)

■ 0–1 ☐ 1–3 ☐ 3–10 ☐ >10

Benefits

Reducing methane emissions was the primary benefit of the project.

Operating Requirements

Ultrasound testing services can be contracted or a detector purchased for regular use.

Applicability

Ultrasound leak detection may be used to detect gas leaks on all in-service shutoff valves.

Methane Emissions Reductions

Methane emissions savings are based on the assumption that the technology finds 100 leaking valves on open-ended lines throughout the company's operation, with an average emissions of rate 20 Mcf per year per valve. Leak rate is averaged from the EPA/GRI report "Methane Emissions from the Natural Gas Industry", Volume 3, and EPA's draft report on default values. One partner has reported methane savings of 5,600 Mcf per year on 3 production compressors.

Economic Analysis

Basis for Costs and Savings

Reported methane emissions savings of 2,000 Mcf per year and cost information apply to testing and repairing 100 valves on open-ended lines in 10 compression plant sites. It is assumed that testing and repair activities will focus on a variety of valves such as pressure relief valves, blown down valves, and starter vent valves.

Discussion

The primary capital cost is the ultrasound detector, which is approximately $250. Operating costs include the labor needed to walk the lines. Assuming it takes 50 hours each year, it will cost about $1,200. Repair may be as simple as tightening the valve closure. This practice is more cost effective when applied to a large number of valves. Gas leakage through valves isolating open-ended lines often grows in volume to a level that is cost effective to find and repair the source.